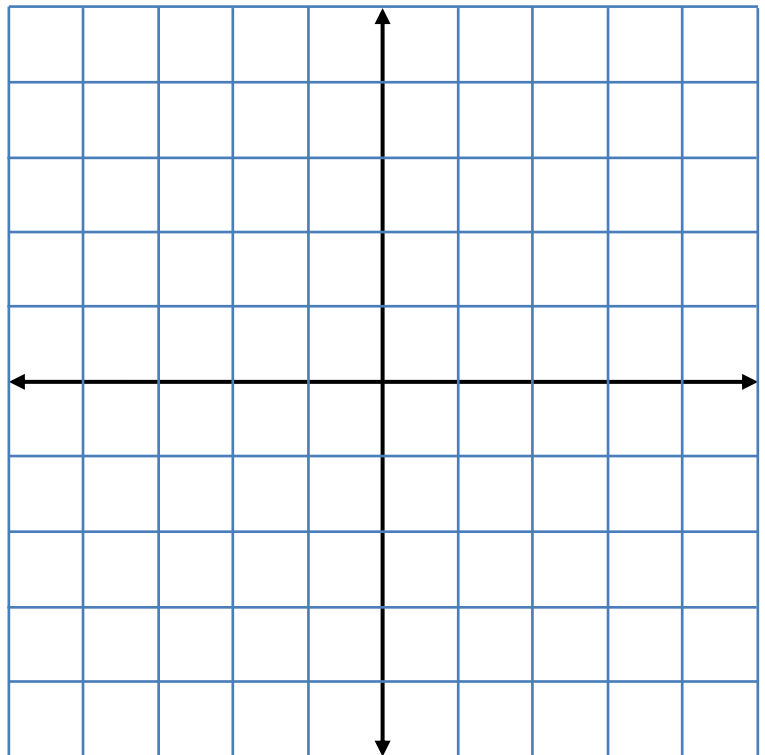


# Midpoint and Distance Formula Exploration

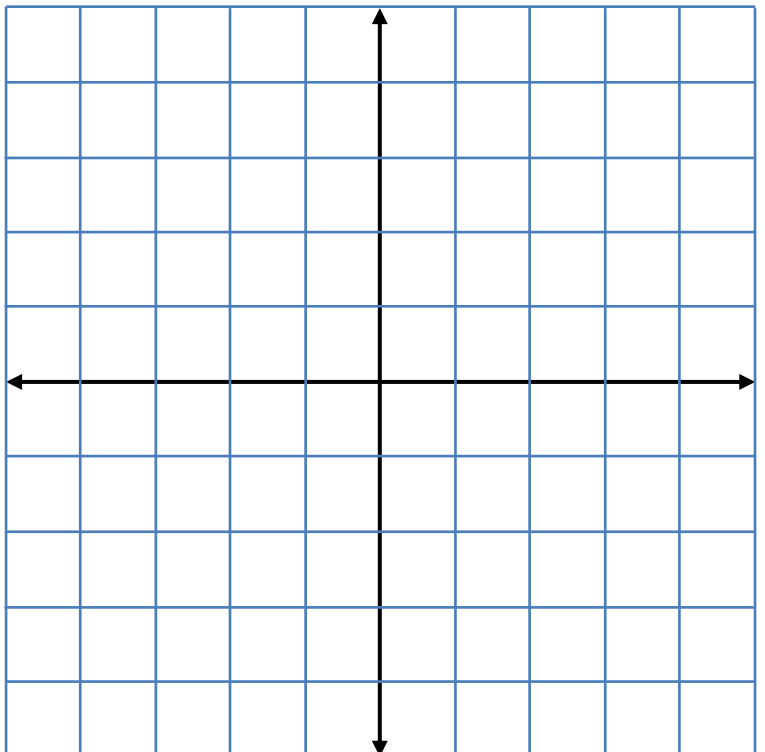
Name \_\_\_\_\_

Work with a partner.

1. Plot the points A(-1, -4) and B(5, 4).
2. Explain how to bisect  $\overline{AB}$ . How would you divide it into two congruent segments?  
\_\_\_\_\_  
\_\_\_\_\_
3. What are the coordinates of the midpoint M? \_\_\_\_\_
4. Look at the x-coordinates of A, B, and M. How are they related? \_\_\_\_\_  
\_\_\_\_\_
5. Compare that relationship with the y-coordinates of A, B, and M. If you are given two points, how can you find the coordinates of the midpoint of  $\overline{AB}$  mathematically?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

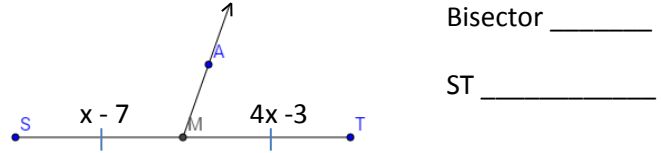
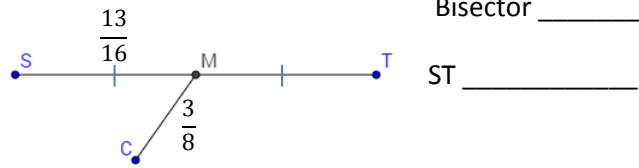


1. Plot the original two points A(-1, -4) and B(5, 4). Also plot C(5, -4).
2. Connect A, B and C with line segments. Then use the Pythagorean Theorem to find AB.
3. Measure the length of  $\overline{AB}$  in centimeters to verify your calculations. \_\_\_\_\_
4. Use the Pythagorean Theorem and point M from the exploration above to find the lengths of  $\overline{AM}$  and  $\overline{MB}$ .
5. Summarize your findings. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

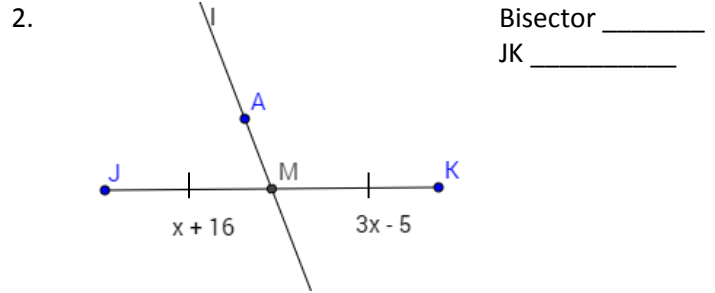
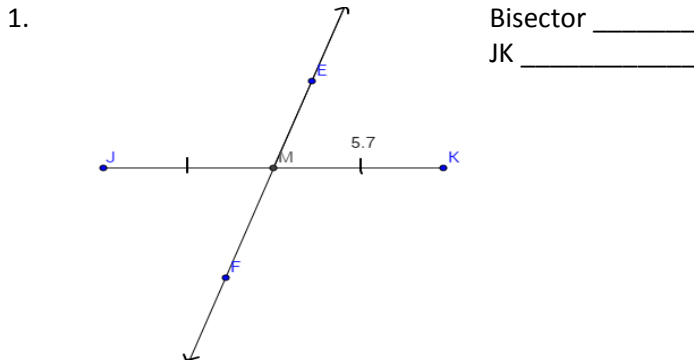


## Finding Segment Lengths

**Example 1** – Identify the segment bisector of  $\overline{ST}$ , then find ST.



Identify the segment bisector of  $\overline{JK}$ , then find JK.



## Using the Midpoint Formula

Write the Midpoint Formula in your Formulas Foldable and tape it in the back of your notebook.

**Example 2** - The endpoints of  $\overline{PQ}$  are  $P(-8, 7)$  and  $Q(7, 3)$ . Find the coordinates of the midpoint M.

M \_\_\_\_\_

**Example 3** – The midpoint of  $\overline{RS}$  is  $M(2, -3)$ . One endpoint is  $R(4, 1)$ . Find the coordinates of endpoint S.

S \_\_\_\_\_

The endpoints of  $\overline{JK}$  are given. Find the coordinates of midpoint M.

3.  $J(-3, 2)$  and  $K(9, 2)$

4.  $J(1, 3)$  and  $K(7, 5)$

The midpoint M and one endpoint of  $\overline{AB}$  are given. Find the coordinates of the other endpoint.

5.  $M(2, 5)$  and  $A(2, 3)$

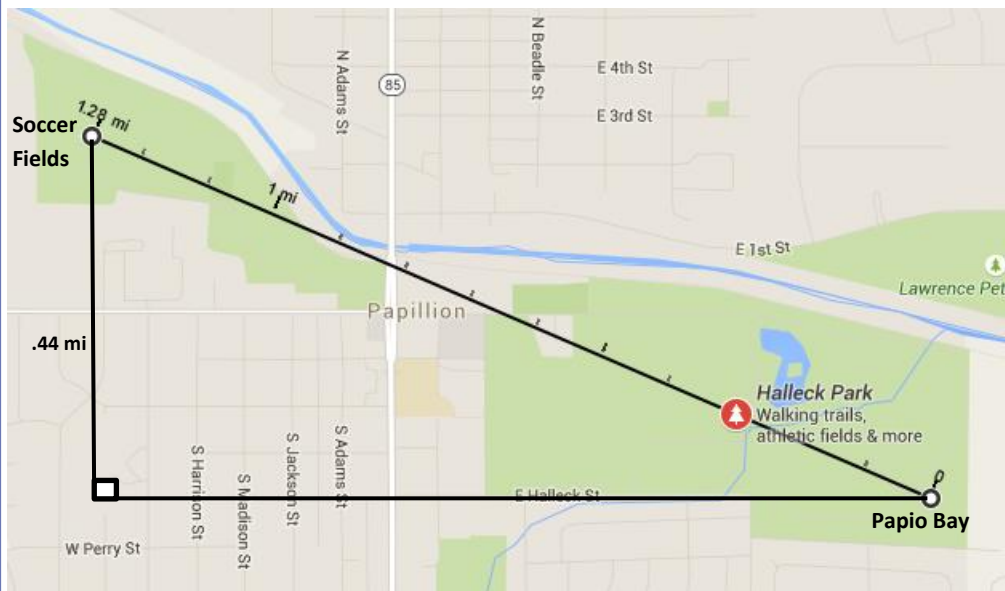
6.  $M(-4, -4)$  and  $B(-1, -1)$

7. Is it possible for a segment to have more than one bisector? Why or why not?

## Using the Distance Formula

Write the Distance Formula in your Formulas Foldable.

**Example 4** – After swimming at the Papio Bay Aquatic Center, you walk 1.28 miles via the park to the soccer fields. How much further would you have walked if you had followed the city streets moving in west and north directions?



**Example 5** – Find the distance between A(13, 2) and B(7, 10).

Find the distance between the points given.

8. A(1, 7) and B(4, 6)

9. E(3, 7) and F(6, 5)

10. G(-1, -5) and H(3, -8)

11. R(0, 1) and S(6, 3.5)

12. Three identical frames will be purchased for a photo collage. If the name for one frame will be placed 72" from the corner and 43" up from the landing and the nail for another frame will be placed 92" from the corner and 29" up, where should the nail for the third frame go if it is to be hung midway between the other two?

